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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/664,002	09/16/2003	Ichiro Uchizaki		3909

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EXAMINER

GOLUB, MARCIA A

ART UNIT PAPER NUMBER

2828

DATE MAILED: 03/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/664,002	Applicant(s) UCHIZAKI ET AL.	
	Examiner Marcia A. Golub	Art Unit 2828	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 February 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 and 7-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 7-13 is/are rejected.
- 7) ☐ Claim(s) 1,10 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☒ Certified copies of the priority documents have been received in Application No. 09/340,349.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>2/28/06</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

Claim 1 is objected to because of the following informalities: in the last line of the claim the word "layer" should be replaced with the word "laser".

Claim 10 is objected to because of the following informalities: the claim is identified as "previously presented" however the claim has been amended and has to be identified as such. Appropriate correction is required.

Response to Arguments

Applicant's arguments, filed 2/28/2008, with respect to double patenting rejection have been fully considered and are persuasive. The double patenting rejection of claims 1-13 has been withdrawn.

Applicant's arguments filed 02/28/2006, with respect to 102(e) rejection have been fully considered, but they are not persuasive.

On pages 8-9 the applicant states that the device disclosed by Bour outputs light with a change of only "tens of nanometers" between lasers and Bour discloses using the same material in both lasers, the examiner wishes to point out that Bour discloses a range of 650 to 720 nm which is very close to the range disclosed by the applicant (650-780). Furthermore, Ishihara teaches using different compositions in the laser materials to obtain the desired range. It is obvious to combine the teachings of Bour and Ishihara to obtain a laser array with the output range of 650 to 780 nm. Also, Kikuchi (6,522,678) discloses a device where two lasers are integrated side by side on the same substrate, one laser containing AlGaAs with output of 780 nm and the other laser containing

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AlGaInP with output of 650 nm. Kikuchi also states that such device is well known in the art. (Fig 2, 1/50-2/6)

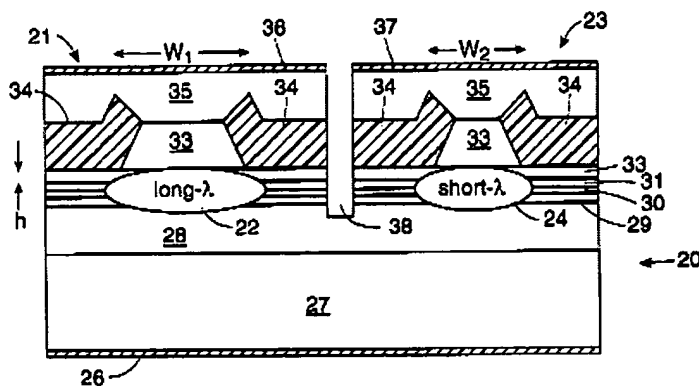
On the bottom of page 9 the applicant states that the stripe ridges in Bour have different thickness, examiner disagrees and points to Fig 4 which clearly shows the layers 33 to have the same thickness h while varying in width w , also Fig 5 shows the layers 44 to have the same thickness h and width w . The Bour does disclose using different thicknesses of the current blocking layer 34 in Fig 5, however the applicant only claims the thickness of the ridge stripe to be the same.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-5, 7 - 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bour et al (Pat. 5,982,799) and further in view of Ishihara (5,978,404).



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Regarding **claims 1, 3-5**, Fig 4 of Bour discloses: "A semiconductor laser array comprising:

- a GaAs substrate; [27]

- a first laser element portion [23] provided on said substrate to release laser light of a first wavelength [short- λ];

- a second laser element portion [21] provided on said substrate to release laser light of a second wavelength [long- λ] different from said first wavelength in a direction substantially parallel to the laser light of the first wavelength; (3/66-67, 4/1-2)

- said first laser element portion including:

 - a first cladding layer [28] made of InGaAlP,

 - an active layer [30] formed by epitaxially growing a first semiconductor material [AlGaInP] on said first cladding layer, (epitaxial grows of a layer is a product by process limitation and is not given a patentable weight in a device claim)

 - a second cladding layer [33] made of InGaAlP formed on said active layer,

 - an etching stop layer formed on said second cladding layer, (etch stop layer is shown if fig 2 and Bour discloses that the structure of the two devices is substantially the same 4/14-15)

 - a convex stripe [33] made of a third cladding layer formed on said etching stop layer (Bour uses the same reference number 33 to designate the stripe layer and second cladding layer since they are made out of the same material)

a current-blocking layer [34] made of GaAs, formed on said second cladding layer to confine an electrical current injected into said convex stripe [33] of said first laser element portion,

and top layer [35] formed to cover said second cladding layer [33];
said second laser element portion including:

a first cladding layer [28] made of InGaAlP,

an active layer [30],

a second cladding layer [33] made of InGaAlP formed on said active layer,

an etching stop layer formed on said second cladding layer,

a convex stripe [33] formed on said etching stop layer,

a current-blocking layer [34] made of GaAs formed on said second cladding layer,

and top layer [35] formed to cover said second cladding layer [33];

and a thickness [h] of said convex stripe [33] of said first laser portion [23] being substantially same as a thickness [h] of said convex stripe [33] of said second laser portion [21]. (4/42-43)

Bour does not disclose that the active layer in the second laser element is formed of the second semiconductor material, which is different from first semiconductor material.

However, different compositions of semiconductor layers are well known in the art. Ishihara discloses using AlGaAs material to obtain a wavelength of 780 nm and AlGaInP material to obtain a wavelength of 650 nm. (1/23-25)

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Ishihara into the device disclosed by Bour by making layers of the first laser that includes an AlGaAs material. The ordinary artisan would have been motivated to modify the device of Bour in the manner set forth above for at least the purpose of creating a laser array that could be used in CD/DVD drive.

Regarding **claims 2, 7 and 8** Bour and Ishihara disclose the semiconductor laser array as disclosed above:

2. "wherein said first and second cladding layers of said first laser element portion are made of AlGaAs and said first and second cladding layers of said second laser element portions are made of $\text{InGa}_{1-x}\text{Al}_x\text{P}$ ($0 < x \leq 1$)" (4/17 and 4/20)
7. "wherein said first wavelength ranges about 780 nm as it's center, and said second wavelength ranges about 650 nm as it's center" (4/39)
8. "wherein said active layer of said first laser element portion includes an AlGaAs layer, and said active layer of said second laser element portion includes an $\text{In}(\text{Ga}_{1-y}\text{Al}_y)\text{P}$ ($0 \leq y \leq 0.2$) layer". (4/19)

Regarding **claim 9** Bour and Ishihara disclose the semiconductor laser array as disclosed above:

Bour specifies using QW structure in the active layer of the laser (4/34) but does not specify that "active layer of said first laser element portion has a bulk structure and said active layer of said second laser element portion has a multiple-quantum well

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structure.” However, single and multiple quantum wells layers as well as bulk layers are well known in the art and used in the active regions of lasers.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to make active layer of the first laser with a bulk structure, and the active layer of the second laser with a MQW structure. The ordinary artisan would have been motivated to modify the device of Bour and Ishihara in the manner set forth above for at least the purpose of creating a laser array where each laser is lasing at a different wavelength and such that the threshold current of one of the lasers (MQW active region) is lower than the threshold current of the other laser (bulk active region).

Claims 10 - 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bour and Ishihara as applied to claims 1-9 above, and further in view of Valster et al (EP 634,823).

Regarding **claims 10 - 13**, Fig 4 of Bour and teachings of Ishihara disclose a laser array as described above but do not disclose a striped shaped intermediate layer selectively formed and positioned between the second cladding layer and top layer in both lasers.

However, intermediate layer is well known in the art of semiconductor technology and is evidenced by Valster. Fig 1 of Valster discloses “a stripe-shaped intermediate layer [5] formed on said second cladding layer and made of a semiconductor material having a smaller band gap than said second cladding layer, and top layer formed to cover said second cladding layer and said intermediate layer and made of a semiconductor material having a smaller band gap than said intermediate layer.” Table

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1 of Valster specifies that the second cladding layer has a band-gap $E_G=2.2$ eV, intermediate layer has $E_G=1.9$ eV, and top layer has $E_G=1.4$ eV. The band-gap values are in correct order $2.2>1.9>1.4$, and therefore meet the limitation of the claim.

Also, the limitation "selectively formed" is a product by process limitation and does not have a patentable weight in a device claim.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the invention of Valster into the device of Bour and Ishihara by integrating an intermediate layer between the second cladding layer and the top layer for at least the purpose of reducing the lattice mismatch between the layers.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

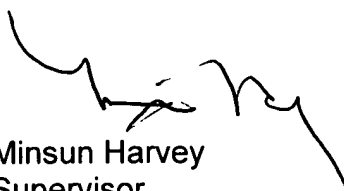
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Fax/Telephone Info

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marcia A. Golub whose telephone number is 571-272-8602. The examiner can normally be reached on M-F 9-6 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minsun Harvey can be reached on 571-272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Minsun Harvey
Supervisor
Art Unit 2828

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